

REMARKS

Claims 1 through 17 are now presented for examination. Claims 2-5 and 9-13 have been canceled without prejudice or disclaimer of subject matter. Claims 1 and 8 have been amended to define still more clearly what Applicant regards as his invention, in terms which distinguish over the art of record. Claims 14-17 have been added to assure Applicant of the full measure of protection to which he deems himself entitled. Claims 1, 8, 14 and 16 are the only independent claims.

The specification objected to for typographical errors at pages 23 and 34. has been amended to incorporate the Examiner's suggestions.

The drawings have been objected to in that Fig. 4 should be labeled as BACKGROUND ART. Accordingly, replacement sheets are submitted herewith with Fig. 4 so labeled.

Claim 1 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0026709 (Hara, et al.) in view of U.S. Patent No. 6,246,845 (Hosoya, et al.). Claim 6 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Hara, et al. in view of Hosoya, et al. as applied to Claim 1 and further in view of U.S. Patent No. 6,397,034 (Tarnawskyj, et al.). With regard to the claims as currently amended, these rejections are respectfully traversed.

Independent Claim 1 as currently amended is directed to image forming apparatus in which an image bearing member bears a toner image thereon and an intermediate transfer member is in contact with the image bearing member in a contact portion. The toner image on the image bearing member is transferred to a transfer medium by the intermediate transfer

member. The Young's modulus of the image bearing member is equal to or greater than 2×10^8 N/m² and equal to or less than 9×10^9 N/m². Contact pressure between said image bearing member and said intermediate transfer member in said contact portion is equal to or greater than 4.0×10^4 N/m² and equal to or less than 7.3×10^4 N/m².

In Applicant's view, Hara et al. discloses a semiconductive member such as a semiconductive belt or a semiconductive roll used with an image formation apparatus that has a portion formed of a thermoplastic elastomer composition comprising a thermoplastic resin 73 as a matrix and rubber particles 72 at least some of which have conductivity and at least some of which are cross-linked as domain.

In Applicant's opinion, Hosoya et al. discloses an electrophotographic machine that has an image forming device configured to form a latent electrostatic image on a latent image carrier. A developing unit is configured to develop a visible image from the latent electrostatic image on the latent image carrier with a liquid developer and a pressure roller is configured to apply pressure to an intermediate transfer medium disposed between the latent image carrier and the pressure roller. The contact pressure between the intermediate transfer medium and the pressure roller is larger than a contact pressure between the intermediate transfer medium and the latent image carrier.

According to the invention of Claim 1, the contact pressure between the image bearing member and the intermediate transfer member in said contact portion is equal to or greater than 4.0×10^4 N/m² and equal to or less than 7.3×10^4 N/m². Advantageously, this contact pressure avoids uneven transfer by reducing the occurrence of an air gap between the transfer medium and the image bearing member and the occurrence of hollow characters.

As noted by the Examiner, Hara et al. does not teach a contact pressure between an image bearing member and a transfer member between $4.0 \times 10^4 \text{ N/m}^2$ and $7.3 \times 10^4 \text{ N/m}^2$. Hosoya et al. may disclose a contact pressure between a pressure roller 25 and a backup roller 24 in the contact portion of about 500 to 10,000g/cm² but preferably about 1500 to 6000 g/cm² (1.47×10^5 to $5.88 \times 10^5 \text{ N/m}^2$). The cited combination of Hara et al. and Hosoya et al., however, provides a contact pressure between a pressure roller and a backup roller that has a pressure which can cause hollow characters but does not teach or suggest the feature of Claim 1 of an intermediate transfer member contacting an image bearing member in a contact portion with a contact pressure in the contact portion equal to or greater than $4.0 \times 10^4 \text{ N/m}^2$ and equal to or less than $7.3 \times 10^4 \text{ N/m}^2$ as in Claim 1. It is not seen that the cited combination of Hara et al. and Hosoya et al. suggests the features of Claim 1. It is therefore believed that Claim 1 as currently amended is completely distinguished from any combination of Hara et al. and Hosoya et al. and is allowable.

Claims 1 and 7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,807,651 (Rimai, et al.) in view of U.S. Patent Application Publication No. 2002/0164177 (Watanabe, et al.). With regard to the claims as currently amended, this rejection is respectfully traversed.

Rimai et al. discloses an arrangement for electrophotographically-produced images using small toner particles when the image is developed on an electrostatographic recording member, preferably an organic photoconductive element, which has been overcoated with a thin (about 10 nm to about 10 .mu.m thick) layer of a material having a Young's modulus greater than 10 GPa and preferably greater than about 100 GPa. The image is then transferred to an

intermediate member which is comprised of an elastomeric blanket between about 0.1 and about 3 cm thick, having a Young's modulus between about 0.5 MPa and about 50 MPa, and preferably between about 1 and about 10 MPa, and having an electrical resistivity between about $10^{10.6}$ ohm-cm and about 10^{12} ohm-cm, by applying an appropriate electrostatic potential between the transfer intermediate member and the photoconductive element. The toned image is transferred from the intermediate transfer member to the receiver by applying an electrostatic field between the receiver and the intermediate transfer member. The blanket material comprising the intermediate transfer member should be overcoated with a thin (between about 0.1 μm and about 25 μm thick) layer of a material having a Young's modulus greater than about 100 MPa and preferably greater than about 1 GPa.

Watanabe et al. discloses an image forming apparatus that has an optical unit which forms an electrostatic latent image on a surface of a photosensitive body. A developing device supplies a liquid developer on the electrostatic latent image formed by the optical unit, and develops the electrostatic latent image into a developer image. A condensing device condenses the developer image, and a transfer device which transfers the developer image condensed by the condensing device to a recording medium, while applying a shearing stress to the developer image.

As discussed with respect to Hara et al. and Hosoya et al., it is a feature of Claim 1 that a toner image on said image bearing member is transferred to a transfer medium by the intermediate transfer member with a Young's modulus of the image bearing member is equal to or greater than $2 \times 10^8 \text{ N/m}^2$ and equal to or less than $9 \times 10^9 \text{ N/m}^2$. As recognized by the Examiner, Riamai does not teach the photoconductive primary image member being in contact

with the intermediate transfer drum within a pressure range $4.0 \times 10^4 \text{ N/m}^2$ and $7.3 \times 10^4 \text{ N/m}^2$.

Further, Rimai et al. teaches that the Young's modulus should be greater than 10GPa.

Accordingly, Claim 1 as amended is completely distinguished from Rimai et al.

Watanabe et al. has been cited as teaching a photosensitive body in contact with an intermediate transfer member at an average contact pressure of 1 kg/cm^2 ($9.8 \times 10^4 \text{ N/m}^2$). We note that the priority date of the present application is July 30, 2002, the filing date of the priority document Japanese Patent Application 2002-221515, which precedes the filing date of the Watanabe et al. reference. An English translation of the Japanese Patent Application 2002-221515 is being prepared and will be filed supplemental to this amendment. Accordingly, it is believed that Watanabe et al. is not a reference that is citable with respect to the present application. In view of the inapplicability of Watanabe et al. and the foregoing distinctions between Rimai et al. and Claim 1, it is believed that Claim 1 is allowable.

Claim 8 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Hara, et al. in view of Hosoya, et al. and Tarnawskyj, et al.. With regard to the claims as currently amended, this rejection is respectfully traversed.

Independent Claim 8 as currently amended is directed to image forming apparatus in which an image bearing member bears a toner image thereon and an intermediate transfer member is in contact with the image bearing member in a contact portion. The toner image on the image bearing member is transferred to a transfer material by the intermediate transfer member. The surface resistivity of the image bearing member is equal to or greater than $1 \times 10^8 \text{ } \Omega/\square$ and equal to or less than $1 \times 10^{15} \text{ } \Omega/\square$, and contact pressure between said image bearing

member and said transfer member in said contact portion is equal to or greater than 4.0×10^4 N/m² and equal to or less than 7.3×10^4 N/m².

In Applicant's view, Turnawskyj et al. discloses an intermediate transfer member having a fluorinated carbon filled polyimide layer which exhibits controlled conductivity. The fluorinated carbon filled polyimide layer is a substrate having an optional intermediate conformable layer thereon, and having on the intermediate layer, an optional outer release layer.

In accordance with the invention of Claim 8 as amended, a toner image on an image bearing member is transferred to a transfer material by an intermediate transfer member in contact with an image bearing member in a contact portion. The surface resistivity of said image bearing member is equal to or greater than $1 \times 10^8 \Omega/\square$ and equal to or less than $1 \times 10^{15} \Omega/\square$, and the contact pressure between said image bearing member and said transfer member in said contact portion is equal to or greater than 4.0×10^4 N/m² and equal to or less than 7.3×10^4 N/m².

As discussed with respect to Claim 1, Hara et al. does not teach a contact pressure between an image bearing member and a transfer member between 4.0×10^4 N/m² and 7.3×10^4 N/m². Hosoya et al. only teaches a contact pressure between a pressure roller 25 and a backup roller 24 in the contact portion of about 500 to 10,000g/cm² but preferably about 1500 to 6000 g/cm² (1.47×10^5 to 5.88×10^5 N/m²). The cited combination of Hara et al. and Hosoya et al., however, provides a contact pressure between a pressure roller and a backup roller that has a pressure which can cause hollow characters but does not teach or suggest the feature of Claim 8 of an intermediate transfer member contacting an image bearing member in a contact portion with a contact pressure in the contact portion equal to or greater than 4.0×10^4 N/m² and equal to or less than 7.3×10^4 N/m² as in Claim 8.

Turnawskyj et al. may teach an intermediate transfer member having a fluorinated carbon filled polyimide layer with controlled resistivity but fails in any manner to teach or suggest the feature of Claim 8 of a contact pressure between the image bearing member and the transfer member in the contact portion equal to or greater than $4.0 \times 10^4 \text{ N/m}^2$ and equal to or less than $7.3 \times 10^4 \text{ N/m}^2$. It is therefore not seen that the addition of Turnawskyj et al.'s controlled resistivity that is devoid of a contact portion between an image bearing member and an intermediate transfer member with a contact pressure in the contact portion equal to or greater than $4.0 \times 10^4 \text{ N/m}^2$ and equal to or less than $7.3 \times 10^4 \text{ N/m}^2$ to the combination of Hara et al. and Hosoya et al. which is restricted to a contact portion between a pressure roller and a backup roller could possibly suggest the feature of an intermediate transfer member contacting an image bearing member in a contact portion with a contact pressure in the contact portion equal to or greater than $4.0 \times 10^4 \text{ N/m}^2$ and equal to or less than $7.3 \times 10^4 \text{ N/m}^2$ as in Claim 8. It is therefore believed that Claim 8 as currently amended is completely distinguished from any combination of Hara et al., Hosoya et al. and Turnawskyj et al.

Claim 8 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,253,038 (Ito, et al.) in view of Turnawskyj, et al. and Watanabe, et al. With regard to the claims as currently amended, this rejection is respectfully traversed.

As discussed with respect to Claim 1, Watanabe et al. has been cited as teaching a photosensitive body in contact with an intermediate transfer member at an average contact pressure of 1 kg/cm^2 ($9.8 \times 10^4 \text{ N/m}^2$). As noted with respect to Fig. 1, the priority date of the present application is July 30, 2002, the filing date of Japanese Patent Application 2002-221515, precedes the filing date of the Watanabe et al. reference. An English translation of the Japanese

Patent Application 2002-221515 will be filed supplemental to this amendment. Accordingly, it is believed that Watanabe et al. is not a reference that is citable with respect to the present application. Absent the cited teaching of Watanabe et al. it is not seen that Tarnawskyj, et al. in any manner teaches or suggests the features of Claim 8. It is therefore believed that Claim 8 as currently amended is completely distinguished from Tarnawskyj and is allowable.

Newly added independent Claim 14 is directed to image forming apparatus in which an image bearing member bears a toner image and an intermediate transfer member movable in a moving direction contacts the image bearing member at a contact portion. A cleaning member opposed to the movable intermediate transfer member cleans toner on the intermediate transfer member. A charge elimination member opposed to the intermediate transfer member and positioned upstream of the contact portion and downstream of the cleaning member in the moving direction eliminates charge on the intermediate transfer member. The toner image on the image bearing member is transferred to a transfer material by the intermediate transfer member. The surface resistivity of said image bearing member is equal to or greater than $1 \times 10^{15} \Omega/\square$, and the contact pressure between said image bearing member and said intermediate transfer member at the contact portion is equal to or greater than $2.7 \times 10^4 \text{ N/m}^2$ and equal to or less than $7.3 \times 10^4 \text{ N/m}^2$. The features of Claim 14 are disclosed at lines 6 through 17 of page 37 in the specification.

It is a feature of new Claim 14 that a cleaning member is opposed to the movable intermediate transfer member to cleaning toner on the intermediate transfer member and that a charge elimination member is opposed to the intermediate transfer member and positioned upstream of the contact portion and downstream of the cleaning member in the moving direction,

to eliminate a charge on said intermediate transfer member. It is another feature that the surface resistivity of the image bearing member is equal to or greater than $1 \times 10^{15} \Omega/\square$.

Advantageously, the intermediate transferring member is used to prevent color unevenness or a hollow character even though the surface resistivity of said image bearing member is equal to or greater than $1 \times 10^{15} \Omega/\square$.

The cited references are not seen to disclose both a cleaning member and a charge elimination member. In Ito, for example, charging means is disclosed as a member positioned opposed to the intermediate transferring member. The charging member functions to return toner to image bearing member at the transfer portion by charging toner on the intermediate transferring member in order to eliminate the necessity of cleaning member. Accordingly, there is no need for both a charging member and a cleaning member in Ito. It is therefore believed that new Claim 14 is allowable.

Newly added independent Claim 16 is directed to image forming apparatus in which an image bearing member bears a toner image and the toner image on the image bearing member is transferred to an intermediate transfer member. The Young's modulus of said intermediate transferring member is equal to or greater than $2 \times 10^8 \text{ N/m}^2$ and equal to or less than $9 \times 10^9 \text{ N/m}^2$. A transfer member forms a transfer area on the intermediate transfer member to transfer a toner image on the intermediate transfer member to a transfer medium in the transfer area. The ASKER-C hardness of said transfer member ranges between 35 degrees and 49 degrees and the contact pressure between said intermediate transfer member and said transfer member in the transfer area is equal to or greater than $4.0 \times 10^4 \text{ N/m}^2$ and equal to or less than $7.3 \times 10^4 \text{ N/m}^2$. The features of Claim 16 are disclosed at least from page 21 to page 22 in the specification.

It is a feature of Claim 16 that a transfer member forms a transfer area on an intermediate transferring member so that a toner image on said intermediate transfer member is transferred to a transfer medium in said transfer area and another feature that the ASKER-C hardness of said transfer member ranges between 35 degrees and 49 degrees. Advantageously, a nip is maintained using a transfer member with low hardness and the conveyance of the transferring material is substantially improved. It is not seen that any combination of the cited references teaches or suggests the features of Claim 16. Accordingly, it is believed that new Claim 16 is allowable.


A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration or reconsideration, as the case may be, of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable consideration and reconsideration and early passage to issue of the present application.

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Respectfully submitted,



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